

**IN THE ABSTRACT:**

Please DELETE the Abstract in its entirety and substitute the attached new Abstract.

A bidirectional signal processing method uses parallel transmission of digital transmitted data streams in a multiple input-multiple output system. Related art methods generate high bit error rates mostly in singular transmission channels. For this reason, the rank-adaptive signal processing method provides that the number  $n_d$  of active subchannels are varied according to the actual channel behavior in order to effect a robust data transmission even in singular radio channels based on a transmit-side and receive-side channel knowledge and a modification of the data vector by a linear matrix vector multiplication while introducing a factor  $\gamma$  for limiting the maximum transmit power. The maximum transmit power is then only distributed to the currently activated subchannels so that no transmit power remains unused. Another optimization of the number of subchannels  $n_d$  occurs when selecting the modulation and encoding methods. During the optimal rank-adaptation according to the water-filling principle, another power is allocated to each subchannel. Another modulation and encoding method is accordingly selected for each data stream. During the suboptimal rank-adaptation according to the channel inversion principle, all subchannels have the same power whereby enabling the data streams to be modulated and encoded in a common source